

SEP 26 2006

Applicant: Campagnolo et al.
Application No.: 10/690,042**REMARKS**

The above claims are the result of an August 9, 2006 interview, for which the undersigned thanks the Examiner. In that interview, the Examiner agreed that the prior art did not teach or suggest prevention of a shift during backwards-pedaling and also did not teach or suggest only allowing a shift during forwards-pedaling. Thus, all of the currently pending claims contain a variant of one of the two above limitations.

<u>Claim</u>	<u>Limitation</u>
Claims 1, 2, 13	preventing a shift when the sensor detects rearward movement of the chain
Claims 6, 7, 8, 14, and 22-30	allowing, in response to the corresponding signal, a gear shift when the sensor detects forward movement of the transmission chain
Claims 9, 10, and 15	d) shifting the transmission element from the at least one gear to another gear if (1) the detected angular position of the at least one gear corresponds to one of the facilitating portions, and (2) if the transmission chain is not moving rearwards;
Claims 11 and 16	said control unit being configured for preventing shifting of said at least one gear wheel when the gear wheel is not (1) in an angular position corresponding to said at least one given angular position and (2) moving in a forward direction

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Claim 21	an activation switch responsive to the command signal for changing the position of the motion transmission member with respect to the at least one gear when the motion transmission member is moving in the predetermined forward direction
Claim 31	at least one gear that engages a transmission element that performs transmission of motion only during the transmission element's advancement in a forwardly direction
Claim 32	assigning said at least one gear at least one given angular position in which shifting is facilitated only during forward movement of a transmission chain engaged to the at least one gear
Claim 33	a control unit for activating said sensor according to a command request and preventing a gear shift during rearwards movement of the transmission chain
Claim 34	shifting the transmission element from the at least one gear to another gear if the detected angular position of the at least one gear corresponds to one of the facilitating portions and if the transmission element is moving forward
Claim 35	said control unit being configured for preventing shifting of said at least one gear wheel (1) when the gear wheel is not in an angular position corresponding to said at least one given angular position, and (2) when the gear wheel is moving backwards

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Claims 36 and 37	preventing a shift when the sensor detects rearward movement of at least one of the transmission elements.
Claims 38 and 39	only allowing a shift when the sensor detects forward movement of at least one of the transmission elements.

Fukuda only teaches detection of speed of rotation of sprockets (Col. 5, line 12) and shifting only when "the plurality of sprockets are not rotating." Col. 5, line 17.

Fukuda overlooks a critical problem, and one that the current application addresses in some detail; the application publication paragraph [0021] identifies the problem with Fukuda:

[0021] A pure and simple signal of movement [like that taught in Fukuda] is not, however, sufficient, given that, if the chain moves in a direction opposite to the desired one (i.e., in the direction opposite to the direction of pedalling to make the cycle advance), again an undesired result is obtained.

The application goes on to discuss the manner of detecting the direction of chain (or sprocket) movement:

[0051] The output signal of the sensor 2 is basically a sawtooth signal, which assumes a maximum value when the crankpin H1 is in the angular position corresponding to the location of the brush 20 at the end of the channel 14 corresponding to the pin 140, and a minimum value (virtually, zero) when the crankpin

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H1 localizes the brush 20 at the opposite end of the channel 14, i.e., at a point corresponding to the pin 141.

[0052] The fact that the aforesaid sawtooth signal has an inclined rising edge or an inclined falling edge evidently depends, given the same position of installation of the sensor 2, upon the direction of rotation imparted to the crank axle, and hence to the chain K.

[0053] In any case, with an appropriate operation of threshold-setting (carried out directly on the analog signal present on the pin 142, or else on the numeric version obtained following upon an analog-to-digital conversion in the transmission/acquisition phase by the unit 6), it is possible to identify precisely whether the gear wheel to which the sensor is associated (in the example of embodiment here illustrated, the wheel moved by the crank axle) is in one of the angular positions corresponding to the location of the chain K at one of the facilitating portions, i.e., at the start of the sequence of teeth that facilitate the shifting that it is intended to impart on the chain K.

[0054] In addition, again depending upon the aforesaid operation of threshold-setting, the unit 6 is able to verify that the output signal of the sensor 2 varies in time, an indication of the fact that the corresponding gear wheel and the chain K drawn along by it are moving. Finally, detection of the slope (angular coefficient) of the leading and/or trailing edges of the signal in question enables the unit 6 to identify the direction of movement (forwards or backwards) of the chain K itself.

...

[0060] Yet further variant embodiments are evidently within the reach of a person skilled in the sector, without prejudice to the possibility of making a sensor of a potentiometric type that is able to supply at output (on the pin 142, in the exemplary embodiment illustrated) a first signal which uniquely identifies the angular position currently reached by the crankpin H1 of the crank axle, with the further possibility of generating a reference

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signal which indicates passage of the crankpin H1 through a pre-determined angular position, as well as signals identifying movement and direction of movement of the chain K.

And finally, having determined direction, the application contemplates the logical step of insuring forwards movement before allowing a shift.

[0087] The aim of what has been described above is to permit the unit 6 to enable the corresponding actuator (in the example of embodiment illustrated, the actuator 4 associated to the front derailleur) with optimal advance for obtaining the required shifting of the chain properly; it having been detected simultaneously that the chain K is moving forwards, thus preventing the start of any attempt at gear-shifting when the chain is stationary, or else when the chain is moving backwards.

...

[0094] The output YES from step 104, instead, indicates that the chain K is moving, and then, in a subsequent step 105, the unit 6 verifies whether the signal coming from the sensor 2 indicates that the chain K is moving forwards.

All of this thought is particularly important in when discussing electronic gear-shifting, which is done in conjunction with, but without necessarily the brain of, the cyclist. It would be possible, for example, for a cyclist to inadvertently initiate a gear shift with the merest touch of a button, while the pedal was being moves slightly backwards in anticipation of a turn or for another reason.

A derailing at this point (during a turn) could be incredibly dangerous, and all because during electronic shifting, less work, and maybe even an accidental

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depression of a button, initiated a shift. The current system, which prohibits shifting except during forwards movement, would not allow such a situation.

Fukuda does not contemplate the above solution or problem. It notes the importance of tooth alignment and also of movement, but does not once discuss the importance of forward motion in its shifting. That's not to say that Fukuda contemplates *backwards* pedaling during shifting, but this is true: Fukuda's electronic shifting device does not include the absolutely critical step of *preventing* shifting during backwards movement.

Thus, the above claims all contain a limitation not taught or suggested by Fukuda: preventing shifting during backwards movement in the transmission or allowing shifting only during forwards movement in the transmission.

Obvious-Type Double-Patenting

During the interview, the Examiner suggested that a situation of obvious-type double patenting might exist over U.S. Patent No. 6,634,971, from which this application claims priority. A Terminal Disclaimer, submitted herewith, addresses this issue.

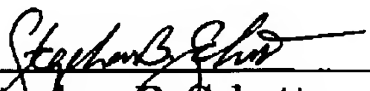
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Conclusion

The pending claims are now believed to be allowable over the prior art. Reexamination and a Notice of Allowance for the pending claims are respectfully requested. If the Examiner believes that a telephone conference would advance the prosecution of this case, the undersigned invites the examiner to call.

Respectfully submitted,

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